

Docket No. 010048

Serial No. 09/922,997

AMENDMENTS TO THE CLAIMS:

1. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a respective transmitting source that is either an origination source or a repeater associated with the origination source;

identifying a particular origination source for each received time measurement;

generating and maintaining a probable origination source list;

comparing a list of originating sources for the received time measurements against ~~a~~ the list of probable origination sources for each of at least one repeater in the network; ~~and~~

determining whether the remote terminal is under a coverage of a particular repeater based on a result of the comparing;

assigning a weighted value to a result of the step of determining wherein the weighted value comprises delays introduces by the at least one repeater; and

calculating the position of the remote terminal based on the time measurements and the assigned weighted value.

2. (Original) The method of claim 1, further comprising:

prior to the comparing, estimating whether the remote terminal is under the coverage of a repeater in the network.

3. (Currently Amended) The method of claim 1, ~~further~~ wherein the step of generating and maintaining comprises ~~comprising~~:

forming a list of probable origination sources for each repeater within the network.

4. (Original) The method of claim 3, wherein the list of probable origination sources for each repeater is formed via empirical measurements at various locations within a coverage area of the repeater.

Docket No. 010048

Serial No. 09/922,997

5. (Original) The method of claim 3, wherein the list of probable origination sources for each repeater is formed via measurements received from remote terminals operating within a coverage area of the repeater.

6. (Original) The method of claim 1, wherein the origination sources are base stations of a CDMA communication network.

7. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, wherein each transmitting source is either an origination source for a transmission or a repeater associated with the origination source, the method comprising:

cataloging an environment type for each repeater within the network;

generating a probable neighbor list for each repeater from the cataloged environmental types;

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from either an origination source or its associated repeater; and

determining whether the remote terminal is under a coverage of a particular repeater based on the ~~cataloged environment type for each repeater~~ generated probable neighbor list and the received time measurements;

assigning a weighted value to a result of the step of determining wherein the weighted value comprises delays introduces by the particular repeater ; and

calculating the position of the remote terminal based on the time measurements and the assigned weighted value.

8. (Previously Presented) The method of claim 7, further comprising:  
for each origination source within the network, identifying whether or not the origination source is associated with at least one repeater.

9. (Previously Presented) The method of claim 7, wherein the environment type for each repeater is cataloged based on a list of origination sources that may be received while under the coverage of the repeater.

10. (Previously Presented) The method of claim 7, wherein the remote terminal is determined to be under the coverage of the particular repeater if the

**Docket No. 010048****Serial No. 09/922,997**

received time measurements are derived from a limited number of origination sources.

11. (Previously Presented) The method of claim 7, wherein the remote terminal is determined to be under the coverage of the particular repeater if the received time measurements are derived from one or two origination sources.

12. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining at least one time measurement for at least one transmitting source, wherein each received time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source;

generating an maintaining a list of known or estimated propagation delays for each transmitting source;

determining a propagation delays associated with each received time measurement;

comparing the propagation delays for each received time measurement against a predetermined threshold value ~~for the origination source associated with the time measurement~~ of the known or estimated propagation delays; and

determining whether the remote terminal is under a coverage of a particular repeater based on a result of the comparing;

assigning a weighted value to a result of the step of determining wherein the weighted value comprises delays introduces by the repeater; and

calculating the position of the remote terminal based on the time measurements and the assigned weighted value.

13. (Original) The method of claim 12, wherein the threshold value for a particular origination source is derived based in part on an expected worst case propagation delays for a transmission from the origination source to a particular remote terminal located within the coverage of the origination source.

14. (Original) The method of claim 12, wherein the threshold value for a particular origination source is derived based in part on an expected best case propagation delays for a transmission from the origination source via a repeater to a particular remote terminal located within the coverage of the repeater.

Docket No. 010048

Serial No. 09/922,997

15. (Original) The method of claim 12, wherein the threshold value for a particular origination source is selected to reduce a likelihood of erroneously identifying the remote terminal as being under the coverage of a repeater associated with the origination source.

16. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source;

identifying a particular origination source for each received time measurement;

generating and maintaining a list of origination sources and whether each of the origination sources employ at least one repeater;

determining whether the identified origination source for each received time measurement is associated with a repeater;

discarding time measurements for selected ones of origination sources determined to be associated with repeaters; and

determining an initial position estimate for the remote terminal based on remaining time measurements not discarded.

17. (Original) The method of claim 16, further comprising:

retaining time measurement for a reference origination source even if the reference origination source is associated with a repeater.

18. (Original) The method of claim 16, further comprising:

determining whether an origination source not associated with a repeater is available for selection as a reference origination source for the remote terminal.

19. (Original) The method of claim 18, further comprising:

discarding time measurements for origination sources associated with repeaters if at least one origination source not associated with a repeater is available for selection as the reference origination source for the remote terminal.

Docket No. 010048

Serial No. 09/922,997

20. (Original) The method of claim 18, further comprising:  
retaining time measurements for origination sources associated with repeaters if no origination source not associated with a repeater is available for selection as the reference origination source for the remote terminal.

21. (Original) The method of claim 16, further comprising:  
generating one or more search windows for the remote terminal based on the initial position estimate for the remote terminal, wherein each search window is used to search for a respective GPS satellite.

22. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source;

identifying a particular origination source for each received time measurement;

determining an initial position estimate for the remote terminal based on the received time measurements;

generating and maintaining a list of origination sources and whether each of the origination sources employ at least one repeater;

determining whether the origination source for at least one time measurement used to determine the initial position estimate for the remote terminal is associated with a repeater; and

assigning a weighted value to a result of the step of determining wherein the weighted value comprises delays introduced by the at least one repeater; and

generating one or more search windows for the remote terminal based on the initial position estimate for the remote terminal, wherein each search window is used to search for a respective GPS satellite.

23. (Original) The method of claim 22, further comprising:  
compensating the one or more search windows if any time measurement used to determine the initial position estimate for the remote terminal is derived from an origination source associated with a repeater.

Docket No. 010048

Serial No. 09/922,997

24. (Original) The method of claim 23, wherein the compensating includes

widening at least one search window to account for ambiguity due to the repeater.

25. (Original) The method of claim 23, wherein the compensating includes

adjusting a time offset for at least one search window.

26. (Original) The method of claim 22, wherein the search window for a particular GPS satellite is derived based on estimated closest and furthest distances between the remote terminal and the GPS satellite.

27. (Original) The method of claim 26, wherein the estimated closest and furthest distances between the remote terminal and the GPS satellite account for ambiguity due to at least one time measurement, used to determine the initial position estimate for the remote terminal, being derived from an origination source associated with a repeater

28. (Original) The method of claim 22, wherein a time offset associated with the search window for a particular GPS satellite is derived based on an estimated average distance between the remote terminal and the GPS satellite.

29. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source, and wherein a plurality of time measurements are received for a plurality of transmissions from a particular origination source or its associated repeater;

computing a plurality of position estimates based on the received time measurements;

associating each computed position estimate from the plurality of computed position estimates with a predetermined confidence value wherein said confidence

Docket No. 010048

Serial No. 09/922,997

value comprises delays introduced by the repeater associated with the origination source; and

selecting one of the computed position estimates based the step of associating as an initial position estimate for the remote terminal.

30. (Original) The method of claim 29, further comprising:  
deriving a metric for each computed position estimate, and  
wherein the computed position estimate having a best metric is selected as the initial position estimate for the remote terminal.

31. (Currently Amended) A method for determining a position of a remote terminal in a wireless communication network having included therein a plurality of transmitting sources, the method comprising:

obtaining a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source;

computing a plurality of position estimates based on the received time measurements and a plurality of network hypotheses, wherein each network hypothesis corresponds to a respective combination of origination sources and repeaters hypothesized to be the transmitting sources for the plurality of time measurements used to compute the position estimate for remote terminal;

hypothesizing whether the transmitting source is a origination source or a repeater source a result from the each network hypothesis; and

selecting one of the computed position estimates as an initial position estimate for the remote terminal based on the step of computing and the step of determining.

32. (Previously Presented) The method of claim 31, further comprising:  
for each network hypothesis, if a particular time measurement is hypothesized to be from a repeater and not an origination source, compensating for delays associated with the repeater.

33. (Original) The method of claim 32, wherein the compensating for delays associated with a particular repeater includes  
subtracting out a propagation delays between the repeater and the associated origination source, and

**Docket No. 010048****Serial No. 09/922,997**

subtracting out a second delays introduced by the repeater.

34. (Previously Presented) The method of claim 31, further comprising:  
deriving a metric for each computed position estimate, and  
wherein the computed position estimate having a best metric is selected as  
the initial position estimate for the remote terminal.

35. (Original) The method of claim 34, wherein the metric for each  
computed position estimate is based on a signal strength associated with each  
received time measurement used to compute the position estimate.

36. (Previously Presented) The method of claim 31, wherein each received  
time measurement is derived from a respective and different origination source.

37. (Previously Presented) The method of claim 31, further comprising:  
generating one or more search windows based on the initial position estimate  
for the remote terminal, wherein each search window is used to search for a  
respective GPS satellite.

38. (Original) The method of claim 37, further comprising:  
deriving a final position estimate for the remote terminal based on one or  
more time measurements from one or more GPS satellites.

39. (Currently Amended) A remote terminal in a wireless communication  
network, comprising:

a receiver unit configured to receive, process, and digitize a received signal to  
provide samples;

a demodulator coupled to the receiver unit and configured to receive and  
process the samples to provide a set ~~to~~ of time measurements for a set of  
transmitting sources, wherein each time measurement is derived based on a  
transmission received at the remote terminal from a respective transmitting source  
that is either an origination source or a repeater associated with the origination  
source;

a controller operatively coupled to the demodulator and configured to receive  
the time measurements and further configured to receive or derive one or more  
search windows based on an initial position estimate for the remote terminal,  
wherein each search window is used to search for a respective GPS satellite; and



**Docket No. 010048****Serial No. 09/922,997**

a GPS receiver operatively coupled to the controller and configured to search for one or more GPS satellites in accordance with the one or more search windows.

40. (Original) The remote terminal of claim 39, further comprising:  
a signal quality measurement unit operatively coupled to the demodulator and configured to derive an estimate of a signal strength for each transmission used to derive a time measurement.

41. (Original) The remote terminal of claim 39, further comprising:  
a modulator operatively coupled to the controller and configured to receive and process the set of time measurements; and  
a transmitter unit operatively coupled to the modulator and configured to transmit the set of time measurements.

42. (Original) A processing unit in a wireless communication network, comprising:  
a transceiver configured to exchange data with a network entity;  
a receive data processor coupled to the transceiver and configured to receive from a remote terminal a set of time measurements for a set of transmitting sources, wherein each time measurement is derived based on a transmission received at the remote terminal from a transmitting source that is either an origination source or a repeater associated with the origination source; and  
a controller coupled to the receive data processor and configured to determine whether the remote terminal is under a coverage of a repeater within the network and to derive an initial position estimate for the remote terminal based on the received time measurements.

43. (Original) The processing unit of claim 42, wherein the controller is further configured to generate one or more search windows for the remote terminal based on the initial position estimate for the remote terminal, wherein each search window is used to search for a respective GPS satellite, the processing unit further comprising:

a transmit data processor coupled to the controller and the transceiver and configured to receive and forward the one or more generated search windows to the transceiver for transmission to the remote terminal.

**Docket No. 010048****Serial No. 09/922,997**

44. (Original) The processing unit of claim 42, wherein the controller is further configured to

compute a plurality of position estimates based on the received time measurements and a plurality of network hypotheses, wherein each network hypothesis corresponds to a respective combination of origination sources and repeaters hypothesized to be the transmitting sources for the plurality of time measurements used to compute the position estimate for remote terminal, and

select one of the plurality of computed position estimates as the initial position estimate for the remote terminal.

45. (Original) The processing unit of claim 42, further comprising:

a data storage unit configured to store a list of probable origination sources for each repeater within the network, and

wherein the controller is further configured to determine whether the remote terminal is under the coverage of a particular repeater in the network by comparing a list of originating sources for the received time measurements against the list of probable origination sources for each repeater within the network.